

FACT SHEET FOR NPDES PERMIT NO. WA0040291
BOSTON HARBOR
WASTEWATER FACILITY

SUMMARY

The Boston Harbor Wastewater Facility was newly permitted and began discharging in March of 1990. The facility is designed to handle up to .045 million gallons per day (mgd) using a system of batch-operation, extended aeration, and activated sludge. The treatment plant serves a population of 600 on approximately 275 acres.

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INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the state of Washington on the basis of Chapter 90.48 RCW which defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	Thurston County Public Works
Facility Name and Address	Boston Harbor Wastewater Facility 2000 Lakeridge Drive SW Olympia, Washington 98502
Type of Treatment	STEP system, Batch operated, extended aeration, activated sludge plant, secondary treatment.
Discharge Location	Dana Passage near the confluence of Budd Inlet Latitude: 46° 08' 30" N Longitude: 122° 54' 27" W.
Water Body ID No.	WA-14-0010

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

HISTORY

Boston Harbor is a small community lying on the shorelines of Puget Sound in Thurston County. The area had been plagued with failing septic systems prior to being served by the sewage treatment plant. On August 20, 1985, Thurston County retained R.W. Beck and Associates to provide engineering to develop the Boston Harbor Wastewater Facilities Plan. This plan recommended the low pressure sewers using a Septic Tank Effluent Pumped (STEP) system, a batch-operated extended aeration sludge treatment plant, and effluent discharge after chlorination near the confluence of Dana Passage and the mouth of Budd Inlet. The plant has been on-line since 1990.

For the first couple of years of operation the facility had difficulty with settling rates and meeting BOD and TSS limits. The plant appears to be under control and has been meeting limits for several years now. The Boston Harbor plant received an award for an exemplary compliance record for the year of 1995.

COLLECTION SYSTEM STATUS

Shortly after the STEP system was installed, there were problems with infiltration from the individual tanks at some of the houses. In 1992, smoke detection equipment was used and water use records were examined. Corrections were made at several of these connections and infiltration and inflow was reduced. In 1999 the highest seven-day summer infiltration flow was about 52 gal/capita/day with 600 residents. The maximum inflow rate for the period of January 1998 through March 2000 was 145 gal/capita/day. These infiltration and inflow rates are approximately one-half the rates that are considered excessive and that might trigger an I/I rehabilitation program under EPA criteria. However, the permittee should continue to monitor the inflow and infiltration as described in the permit.

One problem that does occur with the treatment system is excessive loading following power outages. The sewage treatment plant has emergency backup power, however, the septic tanks at individual homes do not have backup power. When power resumes after an extended outage, there is a loading from the septic tanks pumping all at once. To remedy this problem, the permittee proposes to put in an equalization basin that can take the peaks off of the loads.

TREATMENT PROCESSES

The Boston Harbor sewage treatment begins with a septic tank at each house that is pumped to the treatment plant. The septic tank wastewater is pumped to the sewage treatment plant as influent to one of two batch-operated, extended aeration tanks. The reactors receive activated sludge. Before the effluent is discharged, it receives chlorine disinfection. The outfall is located in 110 feet of water approximately 3600 feet north of the Boston Harbor marina.

There are no industrial or commercial users at Boston Harbor.

The plant is classified as a Class II plant. The Thurston County Wastewater Utility staff several plants throughout the county. Most of their operators have duties that range beyond Boston Harbor. The Boston Harbor plant is staffed with an operator of at least group II for eight hours per day—five days per week. Each operator spends up to one month at the Boston Harbor plant before being rotated to another plant. The Thurston County Wastewater Utility has two other group II operators.

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DISCHARGE OUTFALL

The discharge outfall lies 110 feet below the water surface and 3600 feet north of Boston Harbor. The end of the eight-inch pipe has a diffuser, however, because of hydraulic backpressure problems, the end cap of the diffuser pipe was removed. With the end cap removed, most of the effluent apparently discharges through this one opening. The secondary treated and disinfected effluent is discharged into Dana Passage north of the mouth of Budd Inlet.

RESIDUAL SOLIDS

Sludge from the batch reactors is wasted to an aerobic digester for thickening. The thickened sludge and settled solids from the septic tanks are pumped and hauled to LOTT wastewater plant in Olympia for processing. Most of the screening and oil and grease and rag retention is handled by the septic tanks. The plant does not rescreen the wastewater from the septic tanks before it enters the plant. Sludge management is included in the Operations and Maintenance manual.

The treatment facilities remove solids during the treatment of the wastewater at the septic tanks (grit and screenings), and at the primary and secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum and screenings are drained and disposed of as solid waste at the local landfill.

PERMIT STATUS

The previous permit for this facility was issued on March 29, 1990. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS), pH, and fecal coliform bacteria.

EFFLUENT LIMITATIONS

The monthly and weekly averages for BOD₅ and suspended solids are based on the arithmetic mean of the samples taken. The averages for fecal coliform are based on the geometric mean of the samples taken.

Total available (residual) chlorine shall be maintained which is sufficient to attain the fecal coliform limits specified above. Chlorine concentrations in excess of that necessary to reliably achieve these limits shall be avoided.

An application for permit renewal was submitted to the Department on October 4, 2000, and accepted by the Department on October 10, 2000.

SUMMARY OF PREVIOUS PERMIT LIMITATIONS AND COMPLIANCE

The previous permit had limitations that included:

Parameter	Monthly Average	Weekly Average
BOD ₅	30 mg/l, 11 lbs/day	45 mg/l, 17 lbs/day
TSS	30 mg/l, 5 lbs/day	45 mg/l, 7 lbs/day
Fecal Coliform	200 col/100 ml	400 col/100 ml
pH	In the range of 6.0 – 9.0	

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The facility received its last class I inspection on August 15, 2000.

During the period of January 1999 through March 2000 the facility has been mostly in compliance, with the exception of a few occasions where the percent removal of BOD and TSS have fallen below the limits. This may be attributed to the treatment that has already taken place in the septic tanks. The influent entering the plant may already be low in BOD and TSS. In the early years of the permit, when the plant was new, there were troubles meeting limits. However, the plant appears to have been functioning satisfactorily since at least 1995.

The laboratory at Boston Harbor is accredited through the Department for conducting tests on BOD, total residual chlorine, dissolved oxygen, pH, TSS, and TVS.

Because the Boston Harbor treatment works use septic tank effluent pumped (STEP), the requirement to provide 85 percent reduction in TSS and BOD within the plant should not apply. Within a STEP system there is a great deal of reduction that occurs within the septic systems. Therefore, limits on the percent reduction have been removed for this permit.

WASTEWATER CHARACTERIZATION

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports. The effluent is characterized as follows:

Table 1: Wastewater Characterization

Parameter	Influent Concentration	Effluent Concentration
Flow	.032 mgd (annual average)	
PH		6.8 – 8.1
Fecal coliform		33 col/100 ml (highest monthly average)
BOD ₅	375 mg/l, 82 lbs/day (highest monthly average)	25 mg/l, 6.6 lbs/day (highest monthly averages)
TSS	239 mg/l, 47 lbs/day (highest monthly average)	16 mg/l, 4.8 lbs/day (highest monthly averages)
Dissolved Oxygen		6.0 mg/l, (lowest monthly average)

Boston Harbor has not tested for toxic pollutants. There is very little likelihood of toxic pollutants as there are no commercial or industrial dischargers to the treatment plant.

PROPOSED PERMIT LIMITATIONS

Federal and state regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

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The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The design criteria for this treatment facility are taken from the 1990 permit and fact sheet and the engineering report prepared by R.W. Beck in 1986. The final design criteria are the result of proposed changes to the sequencing batch reactors which were submitted to the Department of Ecology for approval. The engineering report for the changes was approved on November 16, 2000. The interim and final changes to the design are as follows:

Table 2: Design Standards for Boston Harbor WWTP.

Parameter	Interim Design Quantity	Final Design Quantity
Monthly average flow (max. month)	0.045 MGD	0.054 MGD
Instantaneous peak flow	0.170 MGD (2 hour duration)	0.170 MGD (2 hour duration)
Maximum Daily Flow (24 hours)	--	0.101 MGD
Actual batch discharge	125gpm for 60 min. per cycle (0.180 MGD)	125gpm for 60 min. per cycle (0.180 MGD)
BOD ₅ influent loading	72 lbs/day (peak)	100 lbs/day
TSS influent loading	30 lbs/day	30 lbs/day
Ammonia, maximum monthly ave.	15 lbs/day	28 lbs/day
Design population equivalent	600	600

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (state). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The following technology-based limits for pH, fecal coliform, BOD₅, and TSS are taken from Chapter 173-221 WAC are:

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Table 3: Technology-based Limits.

Parameter	Interim Limit	Final Limit
PH	shall be within the range of 6 to 9 standard units.	
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL	
BOD ₅ (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L, 11 lbs/day Average Weekly Limit is: - 45 mg/L, 17 lbs/day	Average Monthly Limit is the most stringent of the following: - 30 mg/L, 14 lbs/day Average Weekly Limit is: 45 mg/L, 20 lbs/day
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L, 5 lbs/day - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit is: 45 mg/L, 7 lbs/day	
Chlorine Residual	7.5 µg/l at the edge of the dilution zone	

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

BOD

The monthly effluent mass loading is based on the most stringent of the two following methods.

The monthly effluent mass loadings (lbs/day) were calculated as the maximum monthly design flow (.045 MGD) x Concentration limit (30 mg/L) x 8.34 (conversion factor) = mass limit 11 lbs/day for an interim limit. With a proposed increase in the design flow to (.054 MGD) the mass limit will increase to 14 lbs/day for a final limit.

Monthly effluent mass loadings (lbs/day) were calculated as the maximum monthly influent design loading (72 lbs./day) x 0.15 = 11 lbs./day an alternative way of calculating the interim limit. With the proposed changes to the facility design, BOD influent loading can increase to 100 lbs/day. Therefore a final limit using this method of calculation would be 15 lbs/day. Because this is less stringent, the 14 lbs/day (after rounding) will be used as a final limit.

The weekly average effluent mass loading is calculated as 1.5 x monthly loading (11 lbs/day) = 17 lbs/day for the interim limit. With changes to the system capacity, the weekly average effluent mass loading will increase to 1.5 x (13.5 lbs/day) = 20 lbs/day for a final limit.

TSS

Monthly effluent mass loading was calculated using the same methods as were used for BOD.

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$(0.054 \text{ MGD}) \times 30 \text{ mg/L TSS} \times 8.34 = 13.5 \text{ lbs/day}$ using the increased plant capacity. Or loading may be based on the following method if the result is more stringent.

Monthly effluent mass loadings (lbs/day) was calculated as the maximum monthly influent design loading $(30 \text{ lbs/day}) \times 0.15 = 4.5 \text{ lbs/day}$. Because this is more stringent, 5 lbs/day (after rounding) will be used as the limit. This is the interim and final limit.

The weekly effluent mass loading limit is $1.5 \times \text{the monthly loading } (4.5 \text{ lbs/day}) = 7 \text{ lbs/day}$.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the state of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The state was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the state of Washington.

ANTIDEGRADATION

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

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The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses. In this case, the toxins of concern are chlorine and ammonia. The critical time period is the summer season when there is high temperature. Other factors that affect ammonia toxicity include low salinity, and high pH. Because of the great dilutions seen in the Boston Harbor discharge to Dana Passage, a worst case scenario was used to see if there was a reasonable potential to exceed standards. No potential was found.

MIXING ZONES

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

The maximum size of the mixing zone is 651.5 feet long and 621 feet wide. The size of the mixing zone is based on the depth of 110 feet and the length of the diffuser which is 31.5 feet from the first diffuser to the end of the outfall pipe which is open. There are three diffusers at three inches in diameter and the end of the open pipe is eight inches in diameter. Dilution modeling runs were made using both four-4.77" ports to simulate maximum mixing and a model run was made using a single 8.0" pipe. The CORMIX1 dilution model was used for this purpose. The final dilution factors used are described further in this report. The acute mixing zone would be one tenth as large as this maximum or chronic size.

DESCRIPTION OF THE RECEIVING WATER

The facility discharges to Dana Passage which is designated as a Class A receiving water in the vicinity of the outfall. There are no other nearby outfalls. Significant nearby non-point sources of pollutants include the Boston Harbor Marina. There does not appear to be any livestock in the immediate vicinity of the shorelines near Boston Harbor or the outfall. There are septic systems in the Fish Trap loop area northeast of Boston Harbor. However, the condition of these systems is unknown at this time.

Bud Inlet is listed on the federal 303(d) list for not meeting water quality standards for D.O. and pH. However, this appears to be related to pollution problem in inner Bud Inlet and not the outer waters of Bud Inlet or Dana Passage.

Characteristic uses of Class A waters include the following:

Water quality of this class shall markedly and uniformly exceed the requirements for all or substantially all uses.

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water supply (domestic, industrial, agricultural); stock watering; fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Fecal Coliforms	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	6 mg/L minimum
Temperature	16 degrees Celsius maximum or incremental increases above background. *
pH	6.5 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

* When natural conditions exceed 16, no temperature increases will be allowed which will raise the receiving water temperature by greater than 0.3°C. Incremental temperature increases resulting from point source activities shall not, at any time, exceed $t=12/(T-2)$.

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of a CORMIX1 model. The dilution factors have been determined to be (from Appendix C):

	Acute	Chronic
Aquatic Life	700:1	2630:1
Human Health, Carcinogen		2630:1
Human Health, Non-carcinogen		2630:1

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

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The critical condition for Dana Passage in the vicinity of the Boston Harbor outfall was taken from the Ecology Environmental Assessment Program data for 1997.

Parameter	Value used
Current velocity	4 cm/s chronic, and 10 cm/s acute
Depth	110 feet
Temperature	15.2° C (20° C was used for effluent)
pH (high)	8.1
Dissolved Oxygen	8.0 mg/L
Fecal Coliform	14 col/100 ml (ambient), 400 (effluent)
Salinity	25.8 (ambient), 0 (effluent)

BOD₅--This discharge with technology-based limitations results in a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Technology-based limitations will be protective of dissolved oxygen criteria in the receiving water.

Temperature--The impact of the discharge on the temperature of the receiving water was modeled by simple mixing analysis at critical condition. The receiving water temperature at the critical condition is 15.2 °C and the effluent temperature is 20°C. The predicted resultant temperature at the boundary of the chronic mixing zone is 15.201°C and the incremental rise is 0.001 °C. The standards allow an incremental increase of 0.91°C. Therefore, under critical conditions, there is no predicted violation of the Water Quality Standards for Surface Waters and no effluent limitation for temperature was placed in the proposed permit.

pH--Because of the high buffering capacity of marine water, compliance with the technology-based limits of 6 to 9 will assure compliance with the Water Quality Standards for Surface Waters.

Fecal coliform--The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a dilution factor of 2630:1. Some other scenarios were run for fecal coliform values that include the highest weekly average and the highest monthly average for 1999. These values were weekly average of 224 and monthly average of 33 col/100ml. Using the standard of 14 col/100ml as a background level, the increase was 0.08 col/100ml. (See appendix C). There is also an assumption that chlorine will continue to treat as it is in contact with the effluent in the very long outfall pipe. In the next few years the permittee plans to install UV disinfection which should have a better initial kill-off of the bacteria and does not leave a residual.

Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters with the technology-based limit. Therefore, the technology-based effluent limitation for fecal coliform bacteria was placed in the proposed permit.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

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The following toxics were determined to be present in the discharge: chlorine, and ammonia. A reasonable potential analysis (See Appendix C) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit.

No valid ambient background data was available for pH, chlorine, fecal coliform, or metals. A determination of reasonable potential using zero for background resulted in no reasonable potential.

WHOLE EFFLUENT TOXICITY

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing.

Toxicity caused by unidentified pollutants is not expected in the effluent from this discharge as determined by the screening criteria given in Chapter 173-205 WAC. Therefore, no whole effluent toxicity testing is required in this permit. The Department may require effluent toxicity testing in the future if it receives information that toxicity may be present in this effluent.

If the Permittee makes process or material changes which, in the Department's opinion, results in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal. Toxicity is assumed to have increased if WET testing conducted for submission with a permit application fails to meet the performance standards in WAC 173-205-020, "whole effluent toxicity performance standard". The Permittee may demonstrate to the Department that changes have not increased effluent toxicity by performing additional WET testing after the time the process or material changes have been made.

HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the applicant's discharge is unlikely to contain chemicals regulated for human health and does not contain chemicals of concern based on existing data or knowledge. The discharge will be re-evaluated for impacts to human health at the next permit reissuance.

A determination of the discharge's potential to cause an exceedance of the water quality standards was conducted as required by 40 CFR 122.44(d). The reasonable potential determination was evaluated with procedures given in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) and the Department's Permit Writer's Manual (Ecology Publication 92-109, July, 1994). The determination indicated that the discharge has no reasonable potential to cause a violation of water quality standards, thus an effluent limit is not warranted.

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

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The Department has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no reasonable potential to violate the Sediment Management Standards.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground and therefore no limitations are required based on potential effects to ground water.

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

Monitoring for ammonia and dissolved oxygen is being required to further characterize the effluent and assure that the system continues to work within acceptable limits.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Sludge monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (July 1994) for an activated sludge plant that is less than one mgd.

Additional monitoring is required in order to further characterize the effluent. These monitored pollutants could have a significant impact on the quality of the surface water.

LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at this facility is accredited for: TSS, BOD, pH, and dissolved Oxygen. Fecal Coliform is analyzed at another Thurston County operated treatment plant at Grand Mound.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions

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detailed in proposed permit requirement S.4. to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4. restricts the amount of flow.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains condition S.5. as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

OUTFALL EVALUATION

Proposed permit condition S.6. requires the Permittee to conduct an outfall inspection and submit a report detailing the findings of that inspection. The purpose of the inspection is to determine the condition of the discharge pipe and diffusers and to determine if sediment is accumulating in the vicinity of the outfall.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the state of Washington. The Department proposes that this permit be issued for five years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

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1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.
Metcalf and Eddy.
1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.
R.W. Beck and Associates,
- 1996, June. Boston Harbor Wastewater Facilities Planning Study
Tsivoglou, E.C., and J.R. Wallace.
1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)
Washington State Department of Ecology.
1994. Permit Writer's Manual. Publication Number 92-109
Water Pollution Control Federation.
1976. Chlorination of Wastewater.
Wright, R.M., and A.J. McDonnell.
1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE.
105(E2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on October 8, 2000, and October 15, 2000, in *Daily Olympian* to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department published a Public Notice of Draft (PNOD) on April 17, 2001, in *Daily Olympian* to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Eric Schlorff c/o
Water Quality Permit Coordinator
Department of Ecology
Southwest Regional Office
PO Box 47775
Olympia, WA 98504-7775.

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30) day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by e-mail esch461@ecy.wa.gov, by telephone, 360/407-6554, or by writing to the address listed above.

This permit and fact sheet were written by **Eric Schlorff**.

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART-- An acronym for "all known, available, and reasonable methods of prevention, control, and treatment".

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD₅--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD₅ is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

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Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring --Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial User-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

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Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

Pass through -- A discharge which exits the POTW into waters of the--State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Potential Significant Industrial User--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

- a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

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The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)--

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

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APPENDIX C--TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at <http://www.wa.gov.ecology>.

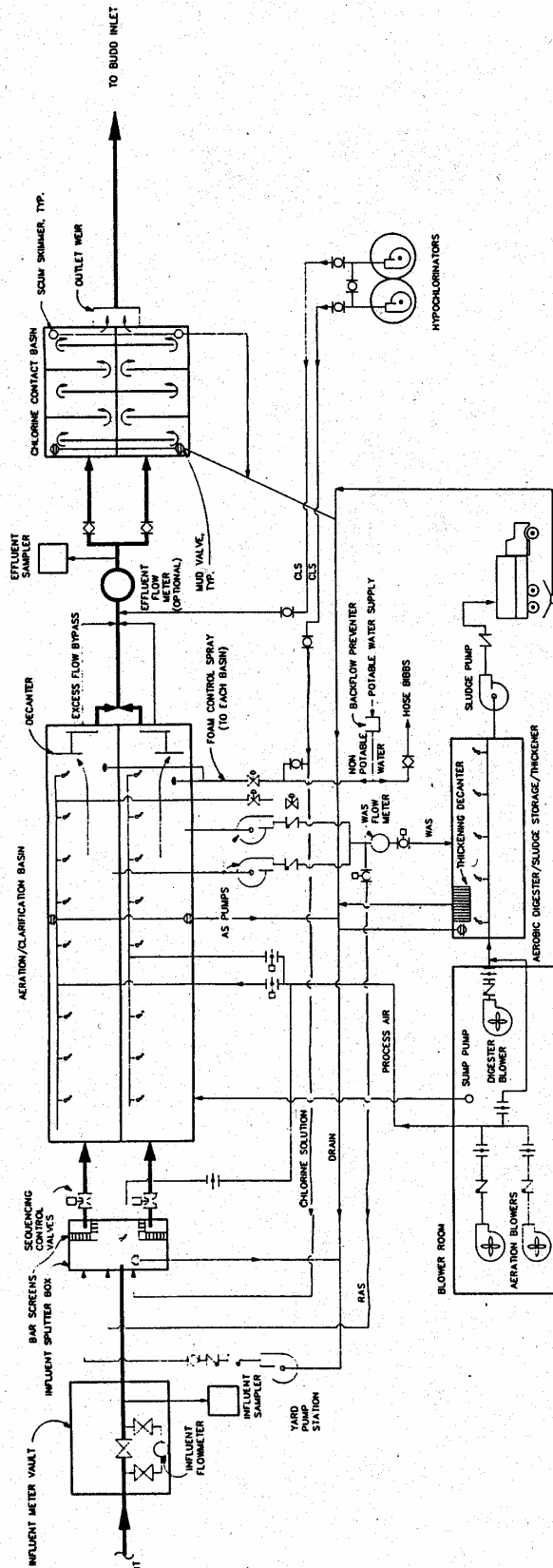
<i>Calculation of seawater fraction of un-ionized ammonia</i>	
<i>from Hampson (1977). Un-ionized ammonia criteria for</i>	
<i>salt water are from EPA 440/5-88-004.</i>	
<i>Based on Lotus File NH3SALT.WK1 Revised 19-Oct-93</i>	
<i>Data is from Budd Inlet and Dana Pass ambient data for 1997</i>	
INPUT	
1. Temperature (deg C):	17.9
2. pH:	8.2
3. Salinity (g/Kg):	23.3
OUTPUT	
1. Pressure (atm; EPA criteria assumes 1 atm):	1.0
2. Molal Ionic Strength (not valid if >0.85):	0.475
3. pKa8 at 25 deg C (Whitfield model "B"):	9.300
4. Percent of Total Ammonia Present as Unionized:	4.465%
5. Unionized ammonia criteria (mg un-ionized NH3 per liter)	
<i>from EPA 440/5-88-004</i>	
Acute:	0.233
Chronic:	0.035
6. Total Ammonia Criteria (mg/L as NH3)	
Acute:	5.22
Chronic:	0.78
7. Total Ammonia Criteria (mg/L as NH3-N)	
Acute:	4.29
Chronic:	0.64

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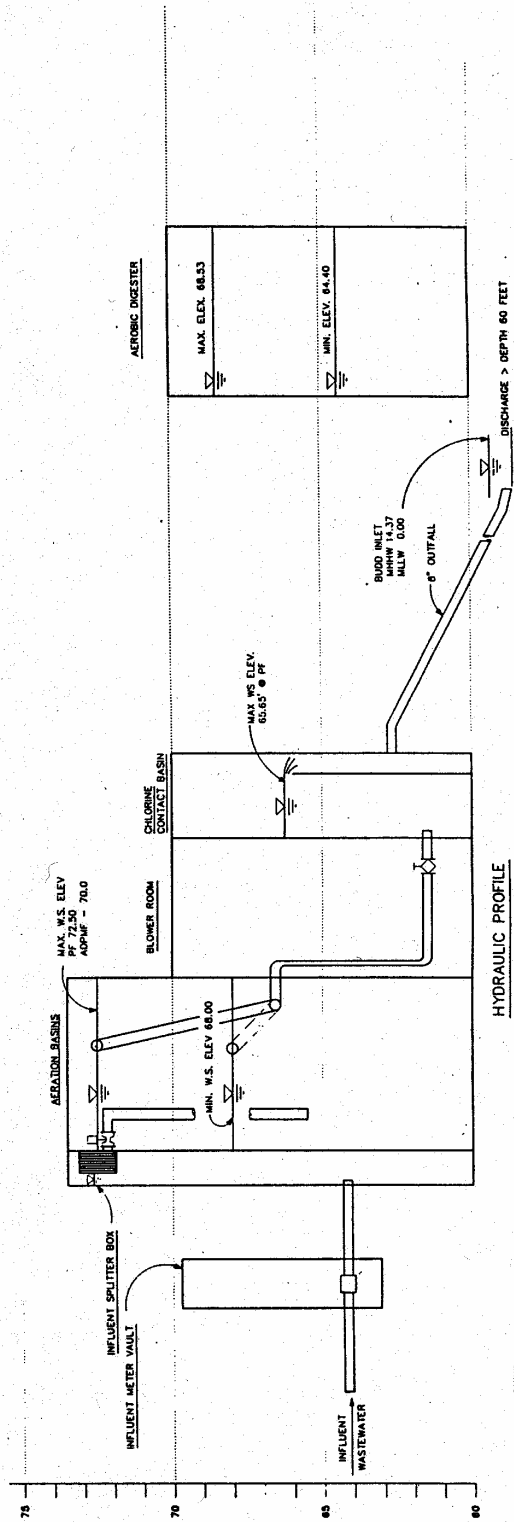
						CALCULATIONS								
	State Water Quality Standard		Max concentration at edge of...											
	Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	LIMIT REQ'D?	Effluent percentile value		Max effluent conc. Measured	Coeff Variation		# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
Parameter	ug/L	ug/L	ug/L	ug/L			Pn	ug/L	CV	s	n			
Ammonia	5.2200	0.7800	0.10	0.03	NO	0.95	0.968	80.00	0.60	0.55	92	0.89	700	2630
Chlorine	13.0000	7.5000	0.02	0.00	NO	0.95	0.991	18.00	0.60	0.55	320	0.68	700	2630

Simple mixing model for temperature and fecal coliform				
EFFLUENT TEMP	AMBIENT TEMP	CHRONIC DIL FACTOR	END TEMP	formula used: (eff+(df-1)amb)/df
20	15.2	2630	15.201825	Allowable incremental increase based on standards is $t=12(T-2)$ which for this case = 0.91°C . Therefore standards not exceeded.
EFF FC	AMB FC	CHR DF	END FC	
400	14	2630	14.146768	Technology based limit
224	14	2630	14.079848	Highest weekly average
33	14	2630	14.007224	Highest monthly average

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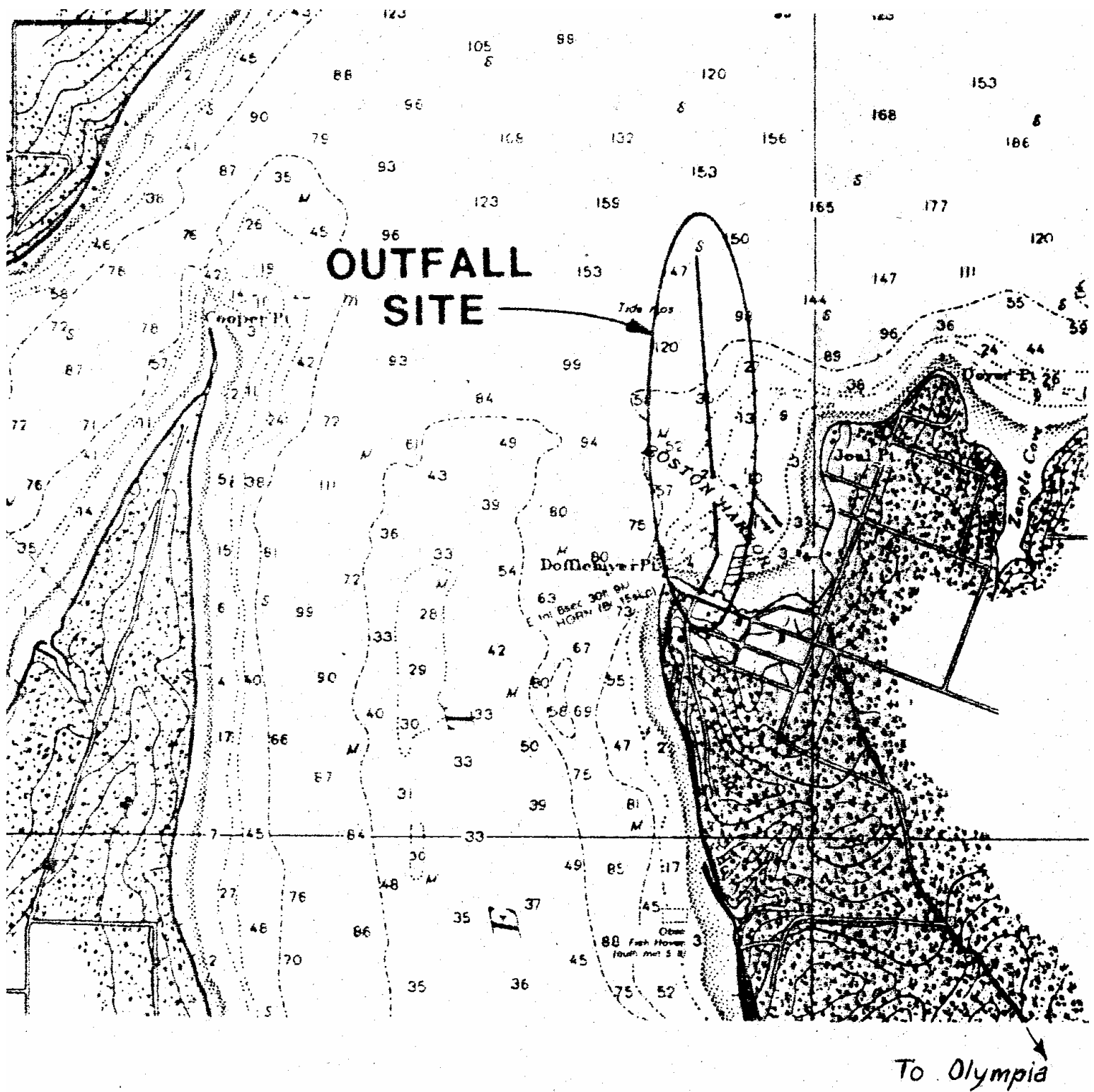


PROCESS FLOW DIAGRAM



HYDRAULIC PROFILE

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APPENDIX D--RESPONSE TO COMMENTS

Comments on the draft Boston Harbor permit and fact sheet.

Citizens for a Healthy Bay (CHB)

CHB had two main comments as follows:

1. An effluent limit for ammonia should be added to section S1 of the permit. According to S2 of the draft permit, effluent ammonia will be sampled monthly. On page 5 of the Fact Sheet, the interim and final design criteria for this pollutant are listed at 15 lbs/d and 28 lbs/d.
2. An effluent limit for chlorine residual should be added to section S1 of the permit. According to S2 of the draft permit, effluent chlorine residual will be sampled weekly. The 700:1 mixing zone is not needed to achieve the technology-based limit for this pollutant of 7.5 ug/L at the edge of the mixing zone (interim and final), listed on page 6 of the fact sheet.

Response to point number one. Ammonia has not proven to be a problem, regular monitoring of ammonia has not shown a problem, and the reasonable potential analysis using new data indicates that ammonia will not violate standards. The increase in design criteria is due to the increase in the physical capacity of plant to treat a larger volume or load of wastewater and still meet the concentration criterion. Ecology felt that an ammonia concentration criterion for the Boston Harbor plant is not required. However, the ammonia interim design criterion describes what the plant is capable of and the final criterion describes what it will be capable of with upgrades.

Response to point number two. The Permittee has stayed within residual chlorine limits and the plant will be retrofitted to disinfect with UV starting in the fall of 2001. In regards to the large mixing zone, the previous permit and fact sheet from 1990 were written when the plant was brand new and did not incorporate the changes in the outfall design. The original design was for the outfall length to be 750 feet angled northwest off of Dofflemyer Point. Instead the outfall length is approximately 3600 feet angled north into the deeper and swifter-flowing waters of Dana pass. This change in outfall location required a detailed computer modeling to determine the actual minimum dilution ratio. The new dilution analysis showed the dilution to be much greater than originally predicted. The current water quality standards do allow mixing zones to be applied to toxic pollutants.

In addition, Ecology has approved plans that will increase the plant capacity. The purpose is to manage large loads following storm events that shut off power to the individual homeowner's septic tanks. The result is that the plant design capacity for loading will increase without increasing concentrations (no increase in mg/L). This change allowing increased capacity will result in a net environmental benefit.

Puget Soundkeeper Alliance (PSA)

PSA also commented on the Boston Harbor permit and fact sheet. The PSA was also concerned about the increase in plant capacity when no increase in population would be occurring. This point is addressed under the above response to CHB comments.

PSA was concerned about the removal of the end cap on the outfall diffuser. In response, the dilution modeling took into consideration the removal of the end cap and the minimum dilution factor was chosen.

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Washington State Department of Health

The State Department of Health, Shellfish Program, commented on the permit and fact sheet. Their main concern was to increase the testing of the chlorine residual from once per week to five per week. Ecology agreed with this decision and has included the five per week sampling for chlorine residual.